

## **REMARKS**

In response to the above Office Action, claims 16-20 have been amended to avoid improper multiple dependency and new claims 21-25 added to cover some of the subject matter formerly covered by these claims.

In addition, claims 1-5 have been amended to avoid the rejection of these claims under §112, second paragraph with respect to the objections to "block," "block rate," and "molecular weight" as set forth on page 2, line 9 to page 3, line 11 of the Office Action. Support for these amendments can be found on pages 9-12 of the specification. Support for the use of GPC with respect to peak molecular weight ranges can be found, for example, on page 12, lines 2-3 of the specification.

Regarding the objection to "block copolymer" in dependent claims 3-5 (page 3, lines 12-14 of the Office Action, what is being claimed here is a mixture of two block copolymers. Thus claims 3-5 have been amended to recite a block copolymer composition.

Regarding the expression "vinyl aromatic hydrocarbon unit number of 1 to 3" in claim 6, this has been changed to "1 to 3 vinyl aromatic hydrocarbon monomer units." It is well understood by those skilled in the art that this is what was meant by the expression.

On page 3, lines 17-20 of the Office Action, the Examiner believes that the limitation in claim 1 that the vinyl aromatic hydrocarbon blocks have a peak molecular weight of as much as 30,000 is contradictory to the limitation that 40-80% of the vinyl aromatic blocks may have a molecular weight of 35,000 which is even higher than the 30,000 maximum peak molecular weight.

Firstly, it should be noted that claim 1 recites "35,000 or less," not "35,000."

In any event, as recited in claim 1, the vinyl aromatic hydrocarbon polymer blocks have a peak molecular weight within the range of 5,000 to 30,000. The blocks may have another peak molecular weight as recited in claim 2. However, regardless of whether the blocks do or do not have a peak molecular weight outside the range of 5,000 to 30,000, the blocks still need to have 40-80%, i.e., a broad distribution range of components having molecular weights of 35,000 or less to satisfy this distribution requirement. Thus the ranges are not inconsistent.

Regarding "respectively" this has been deleted from claims 2-5.

It is believed the claims now comply with the requirements of §112, second paragraph, and its withdrawal as a ground of rejection of the claims is therefore requested.

In the Office Action, the Examiner rejected claims 1-15 under 35 U.S.C. §102(b) for being anticipated or, in the alternative, under 35 U.S.C. §103(a) for being obvious over U.S. Patent No. 5,089,558 to Hall et al. (hereafter Hall). Claims 1, 2, 6, and 9-15 were also rejected under §102(e) for being anticipated by or, in the alternative, under §103(a) for being obvious over U.S. Patent Publication No. 2003/0181584 to Handlin, Jr. (hereafter Handlin) and claims 1-15 under 102(b) and 103(b) over U.S. Patent No. 6,031,053 to Knoll et al. (hereafter Knoll). Finally, claims 3-5, 7, and 8 were rejected over either Handlin or Hall in view of either Broekhuis or Morren.

Hall does not appear to teach the requirement in claim 1 of the claimed proportion of the vinyl aromatic hydrocarbon polymer blocks having a molecular weight of 35,000 or less.

The block copolymer disclosed in Handlin also does not satisfy the requirement that 40 to 80% by weight of the vinyl aromatic hydrocarbon polymer blocks have a molecular weight of 35,000 or less.

For example, polymer #3 (page 6), which is a A-B-A block copolymer, has a molecular weight of 9200-90600-99900. The proportion of the styrene blocks having a molecular weight of 9200 (which corresponds to vinyl aromatic hydrocarbon polymer blocks having a molecular weight of 35,000 or less) is 8.4% by weight  $(9200/9200-99900) \times 100$ . Thus it does not fall within the scope of the claims.

The block copolymer disclosed in Knoll does not disclose that 40 to 80% by weight of the vinyl aromatic hydrocarbon polymer blocks have a molecular weight of 35,000 or less.

For example, the molecular weights of the blocks of Styrene 1 and Styrene 2 of Knoll are each 18,000  $(= 1008 \text{ (Weight of Styrene 1 or 5) } / 9612 \text{ (total monomer amount in Example 1) } \times 172000 \text{ (Mw in Example 1)})$ . Given that Styrene 2 to Styrene 4 each form a random structure with butadiene, they are not counted as "vinyl aromatic hydrocarbon polymer blocks." Accordingly, 100% of the vinyl aromatic hydrocarbon polymer blocks have a molecular weight of 35,000 or less.

Thus it is submitted that none of the cited claims can be considered anticipated by any of Hall, Handlin, or Knoll. Nor should the cited claims be considered obvious in view of any of these references because M.P.E.P. §2143 requires that all of the claim limitations be taught or suggested in a reference to establish a prima facie case of obviousness. Since none of the cited references disclose at least the limitation that "40 to 80% by weight of the vinyl aromatic hydrocarbon polymer blocks have a molecular

weight of 35,000 or less," it is submitted that the claims cannot be considered obvious over these references.

The block copolymer disclosed in Morren (U.S. Patent No. 6,326,127) does not satisfy the requirement that the 40 to 80% by weight of the vinyl aromatic hydrocarbon polymer blocks have a molecular weight of 35,000 or less.

For example, the total styrene content in Example 2 of Morren is 15% by weight. The molecular weight of the styrene block is  $16350 (= 15/100 \times 218700 \text{ (Mw)} / 2 \text{ (number of styrene blocks)})$ . Accordingly, 100% of the vinyl aromatic hydrocarbon polymer blocks have a molecular weight of 35,000 or less. Thus, the copolymer does not fall within the claimed scope.

Nor does the block copolymer disclosed in Broekhuis (U.S. Patent No. 4,940,756) appear to satisfy the requirement of claim 1 that the weight ratio of a vinyl aromatic hydrocarbon and a conjugated diene be 60/40 to 90/10 or the requirement that 40 to 80% by weight of the vinyl aromatic hydrocarbon polymer blocks have a molecular weight of 35,000 or less either.

For example, the total styrene content in Example 1 of Broekhuis is 21% by weight  $(= 440 / (440 + 1640) \times 100)$ . The molecular weight of the styrene block is 51,455  $(= 21/100 \times 0.825 \text{ (the amount of 'gradual addition' styrene)} \times 297,000 \text{ (molecular weight before coupling by diethyl adipate)})$ . Thus, the copolymer does not fall within the claimed scope.

Accordingly, it is submitted that neither of Morren nor Broekhuis supply what is missing in the primary references.

It is believed claims 1-25 are in condition for allowance.

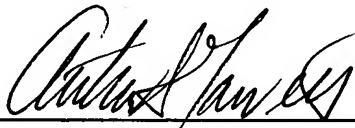
In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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